SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

2102-F-21-R-40

Name: Menno Dam **County**: Hutchinson
Legal Description: T98N-R57W-Sec. 32
Location from nearest town: 1 mi. west, 1½ miles north, ½ mi. west of Menno, SD

Dates of present survey: August 20-22, 2007 (netting); June 9, 2007 (electrofishing)
Dates of last survey: August 22-24, 2005 (netting); June 7, 2005 (electrofishing)
Most recent lake management plan: F-21-R-32 (January 1, 2000-December 31, 2004)
Management classification: Warmwater Permanent

Primary Game Species	Secondary and Other Species
Largemouth Bass	Black Bullhead
Black Crappie	Green Sunfish
Channel Catfish	Yellow Perch
Bluegill	White Sucker

PHYSICAL DATA

Surface Area: 47 acres **Watershed**: 14.4 square miles
Maximum depth: 34 feet **Mean depth**: 13 feet
Volume: No data **Shoreline length**: No data
Contour map available: No **Date mapped**: NA
OHWM elevation: None set **Date set**: NA
Outlet elevation: None set **Date set**: NA
Lake elevation observed during the survey: 16 inches low
Beneficial use classifications: (5) warmwater semipermanent fish propagation, (7) immersion recreation, (8) limited-contact recreation and (9) wildlife propagation and stock watering.

Introduction

The original Menno Lake was an artificial impoundment created by the construction of a dam across Furlong Creek by the Works Progress Administration (WPA) in 1936. The original dam was destroyed by flood waters in 1984. Reconstruction of the dam in a new location slightly downstream was completed in 1995 and fisheries management resumed in 1996.

Ownership of Lake and Adjacent Lakeshore Property

The State of South Dakota owns Menno Dam, and the fishery is managed by the Department of Game, Fish and Parks (GFP). GFP owns some land on the south side of the lake but the rest of the shoreline is privately owned. To allow recreational access, GFP has a 15-foot easement above the Ordinary High Water Mark around the privately owned shoreline.

Fishing Access

The Menno Dam Access Area contains a boat ramp with a dock and a public toilet. The Lake Menno Association manages a small campground on the lake that has camper hookups and a picnic shelter. A new, handicapped-accessible fishing pier is planned for the near future. Shore fishing opportunities are abundant. The entire lake has been designated as a no-wake zone. At no time can boats exceed 5 mph or produce a visible wake.

Field Observations of Water Quality and Aquatic Vegetation

Although the water in Menno Dam was stained brown during the survey, it was still fairly clear with a Secchi depth measurement of 91 cm (3 ft). Some scattered beds of sago pondweed (*Potamogeton* pectinatus) were observed in shallow areas and duckweed (*Lemna* spp) was seen on the surface in protected areas. The lake still contains a considerable amount of flooded brush and timber.

BIOLOGICAL DATA

Methods:

Menno Dam was sampled on August 20-22, 2007 with ten overnight trap net sets. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads. One hour of nighttime electrofishing was done on June 9, 2007 to sample the largemouth bass population. Sampling sites are displayed in Figure 4.

Results and Discussion:

Trap Net Catch

Black crappies comprised 50.2% of the trap-net catch (Table 1). Bluegill, black bullhead, green sunfish, white sucker, channel catfish, and hybrid sunfish were also sampled.

Table 1. Total catch from ten overnight trap net sets at Menno Dam, Hutchinson County, August 20-22, 2007.

Species	Number	Percent	CPUE	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Crappie	324	50.2	32.4	±8.3	25.6	75	1	102
Bluegill	233	36.1	23.3	±10.5	1.1	24	2	91
Black Bullhead	78	12.1	7.8	±1.7	605.8	86	4	86
Green Sunfish	5	0.8	0.5	±0.3	15.0	--	--	--
White Sucker	4	0.6	0.4	±0.4	1.5	--	--	--
Channel Catfish	1	0.2	0.1	±0.1	2.5	--	--	--
Hybrid Sunfish	1	0.2	0.1	±0.1	0.0	--	--	--

* 6 years (1997-1999, 2001, 2003, 2005)

Electrofishing Catch

Seventy-one largemouth bass were sampled during one hour of nighttime electrofishing on June 9, 2007.

Table 2. Largemouth bass sampled during one hour of nighttime electrofishing on Menno Dam, Hutchinson County, June 9, 2007.

Species	Number	Catch/Hour	Mean CPUE*	PSD	RSD-P	Mean Wr
Largemouth Bass	71	71.0	44.6	41	7	97

* 4 years (1998, 2001, 2003, 2005)

Largemouth Bass

Management objective: Maintain a largemouth bass fishery with an electrofishing CPH of at least 20 and RSD-P between 20 and 40.

Largemouth bass electrofishing CPUE increased in 2007 (Tables 2 and 3) and is well above the management objective. Ninety-five adult bass marked with electronic transponder (PIT) tags were stocked in 2006 and only three of the sampled bass contained a tag (Table 9). This indicates that natural reproduction and recruitment is maintaining the population.

All the bass sampled in 2007 were PIT tagged so they could be monitored for age and growth in future surveys. Growth has improved and is similar to regional means (Table 4). About 93% of the bass sampled in 2007 would be protected from harvest under the 38.1 cm (15 inch) minimum length limit.

Table 3. Largemouth bass electrofishing CPUE, PSD, RSD-P, and mean Wr for Menno Dam, Hutchinson County, 1998-2007.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Mean*
CPUE	0.0			110.0		43.5		18.0		71.0	42.9
PSD	--			63		23		100		41	62
RSD-P	--			43		10		75		7	43
Mean Wr	--			92		98		102		97	97

*4 years (1998, 2001, 2003, 2005)

Table 4. Average back-calculated lengths (mm) for each age class of largemouth bass in Menno Dam, Hutchinson County, 2007.

			Back-calculation Age							
Year Class	Age	N	1	2	3	4	5	6	7	8
2005	2	29	107	217						
2004	3	33	111	229	292					
2003	4	4	100	214	265	291				
2002	5	2	115	240	344	386	406			
2001	6	1	112	256	313	368	400	426		
1999	8	1	121	209	273	301	345	401	440	465
1998	9	1	110	197	268	336	376	400	419	430
All Classes		**60**	**111**	**223**	**292**	**336**	**382**	**409**	**429**	**448**
Statewide Mean			96	182	250	305	342			
Region III Mean			111	212	287	347	383			
SLI* Mean			99	183	246	299	332			

*Small Lakes and Impoundments (<150 acres)

Black Crappie

Management objective: Maintain a black crappie fishery with a trap net CPUE of at least 20 and PSD of at least 40.

Black crappie trap net CPUE and PSD have increased significantly since 2005 and now exceed the management objective (Table 5). The population increase can be attributed to natural recruitment since no crappies have been stocked since 1999 (Table 9). Although growth of older fish is extremely slow, growth of the 2003 and 2004 year classes has improved and mean lengths-at-age were similar to statewide and small lakes and impoundments means (Table 6). Improved growth may be in response to a decrease in both the abundance of black bullheads (Table 7) and black crappies (Table 6). However, growth of the two most recent year classes has again slowed.

The length frequency histograms in Figure 2 show an average length of 205 mm (8.1 in) and a narrow length range (18-25 cm, 7.1-9.8 in) for the portion of the population ranging in age from 2 to 9. Condition (mean Wr) of black crappies is good, and yet, growth nearly stops at 200 mm (8 in) (Table 6). This problem is common in many small impoundment across southeastern South Dakota.

Table 5. Black crappie trap-net CPUE, PSD, RSD-P, and mean Wr for Menno Dam, Hutchinson County, 1997-2007.

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2007	Mean*
CPUE	4.5	9.0	55.3		30.1		51.9		2.8	32.4	25.6
PSD	86	25	1		0		39		43	75	32
RSD-P	14	0	1		0		0		0	1	3
Mean Wr	118	118	116		117		94		100	102	111

*6 years (1997-1999, 2001, 2003, 2005)

Table 6. Average back-calculated lengths (mm) for each age class of black crappie in Menno Dam, Hutchinson County, 2007.

			Back-calculation Age							
Year Class	Age	N	1	2	3	4	5	6	7	8
2006	1	20	68							
2005	2	33	59	130						
2004	3	207	74	163	198					
2003	4	22	75	163	191	212				
2001	6	6	85	127	151	170	192	214		
2000	7	14	83	132	160	178	195	215	233	
1999	8	18	84	129	156	172	191	206	218	227
1998	9	6	75	119	149	162	177	195	205	226
All Classes		**326**	**75**	**138**	**167**	**179**	**189**	**207**	**219**	**226**
Statewide Mean			83	147	195	229	249			
Region III Mean			95	167	219	253	274			
SLI* Mean			78	134	180	209	226			

*Small Lakes and Impoundments (<150 acres)

Black Bullhead

Management objective: Maintain a black bullhead population with a trap net CPUE of no more than 100.

Black bullhead trap net CPUE has declined substantially since 1999 (Table 7) resulting in an increase in PSD and an improved population size structure (Figure 3). The mean length of bullheads sampled this year was 263 mm (10.4 in). Increased largemouth bass abundance and poor bullhead recruitment are likely responsible for the population decline.

Table 7. Black bullhead trap-net CPUE and PSD for Menno Dam, Hutchinson County, 1997-2007.

	1997	1998	1999	2001	2002	2003	2004	2005	2007	Mean*
CPUE	116.0	171.2	2276.4	873.3		168.1		29.8	7.8	605.8
PSD	--	36	50	0		1		92	86	36

*6 years (1997-1999, 2001, 2003, 2005)

All Species

Bluegill, black crappie and largemouth bass abundance is relatively high and rough fish abundance is not a problem. Overall, the Menno fishery is in pretty good shape at this time.

Table 8. Electrofishing (EF) and trap-net (TN) CPUE for all fish species sampled in Menno Dam, Hutchinson County, 1997-2007.

Species	1997	1998	1999	2000	2001	2002	2003	2004	2005	2007
CRC (TN)	1.2	--	--		--		--		--	--
COS (TN)	0.5	--	--		--		--		--	--
WHS (TN)	0.5	0.1	3.7		0.1		3.6		1.2	0.4
BLB (TN)	116.0	171.2	2276.4		873.3		168.1		29.8	7.8
CCF (TN)	1.0	1.1	10.6		1.3		0.8		0.1	0.1
NOP (TN)	--	--	0.1		--		--		--	--
GSF (TN)	11.5	58.7	16.7		0.3		0.2		2.6	0.5
HYB (TN)	--	--	--		--		--		--	0.1
BLG (TN)	--	--	1.2		2.1		2.2		0.8	23.3
LMB (EF)	--	0.0	--		110.0		43.5		18.0	71.0
LMB (TN)	--	--	0.6		--		0.1		--	--
BLC (TN)	4.5	9.0	55.3		30.1		51.9		2.8	32.4
YEP (TN)	2.2	2.2	3.2		1.4		0.5		--	--

CRC (Creek Chub), COS (Common Shiner), WHS (White Sucker), BLB (Black Bullhead), CCF (Channel Catfish), NOP (Northern Pike), GSF (Green Sunfish), HYB (Hybrid Sunfish), BLG (Bluegill), LMB (Largemouth Bass), BLC (Black Crappie), YEP (Yellow Perch),

MANAGEMENT RECOMMENDATIONS

1. Continue to monitor the lake by conducting biennial netting and electrofishing surveys.

2. Stock adult or fingerling channel catfish to provide an alternative fishery and for additional bullhead control.

3. Develop a study in conjunction with South Dakota State University to identify productivity problems in Lake Menno and other southeastern South Dakota small impoundments.

4. Take a dissolved oxygen profile during mid to late summer to check for stratification.

5. Consider periodic drawdowns to establish vegetation

Table 9. Stocking record for Menno Dam, Hutchinson County, 1996-2007.

Year	Number	Species	Size
1996	360	Black Crappie	Fingerling
	250	Black Crappie	Adult
	4,700	Channel Catfish	Fingerling
	4,770	Largemouth Bass	Fingerling
	5,000	Rainbow Trout	Fingerling
1997	1,120	Black Crappie	Adult
	4,700	Channel Catfish	Fingerling
	210	Largemouth Bass	Fingerling
1998	313	Black Crappie	Adult
	4,700	Largemouth Bass	Fingerling
1999	2,200	Black Crappie	Juvenile
	393	Largemouth Bass	Adult
	4,700	Largemouth Bass	Fingerling
2000	2,500	Largemouth Bass	Fingerling
	71	Largemouth Bass	Adult
2004	170	Channel Catfish	Adult
2005	100	Channel Catfish	Adult
2006	95	Largemouth Bass	Adult
	50	Channel Catfish	Adult

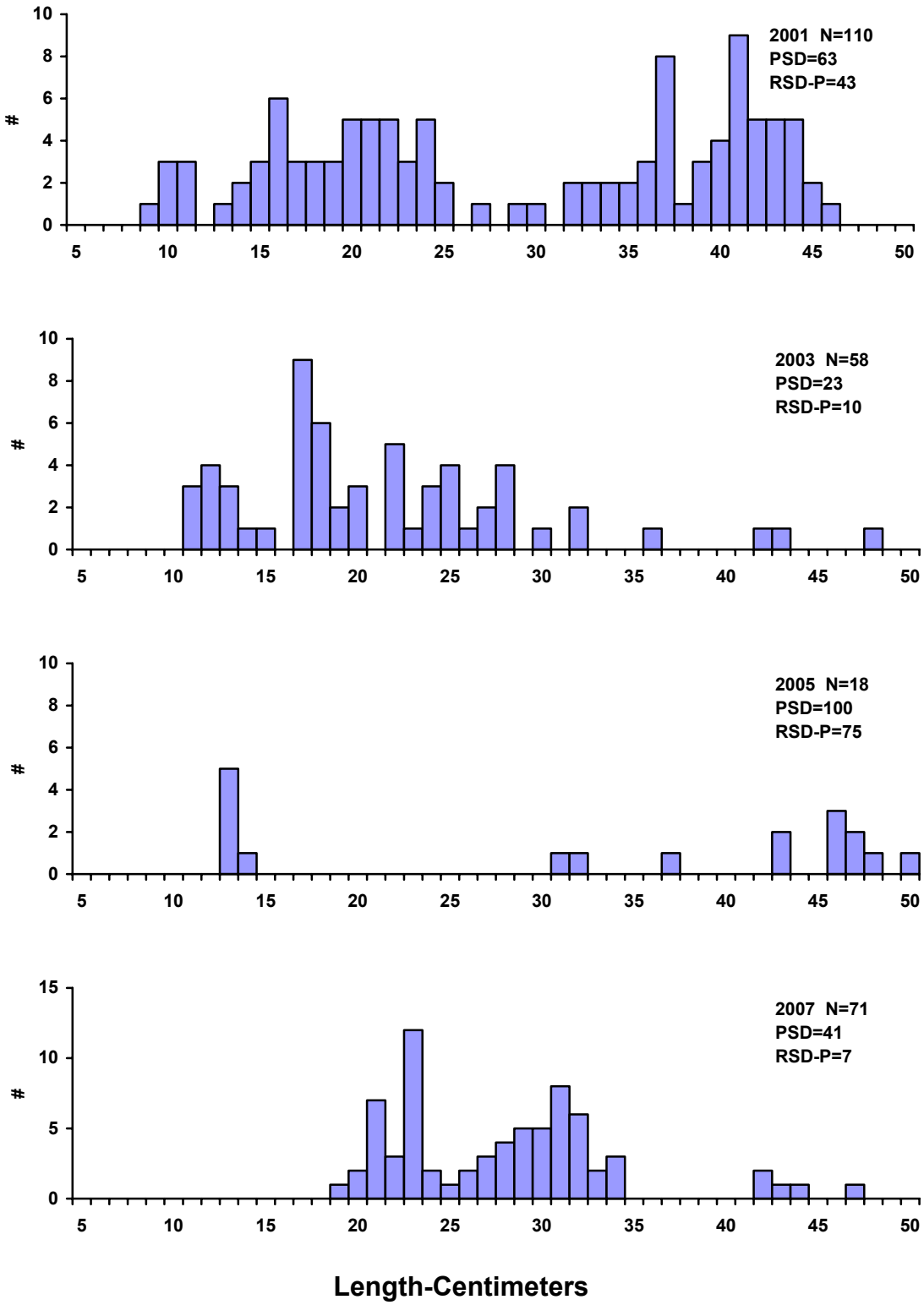

Figure 1. Length frequency histogram for largemouth bass sampled by electrofishing in Menno Dam, Hutchinson County, 2001, 2003, 2005, and 2007.

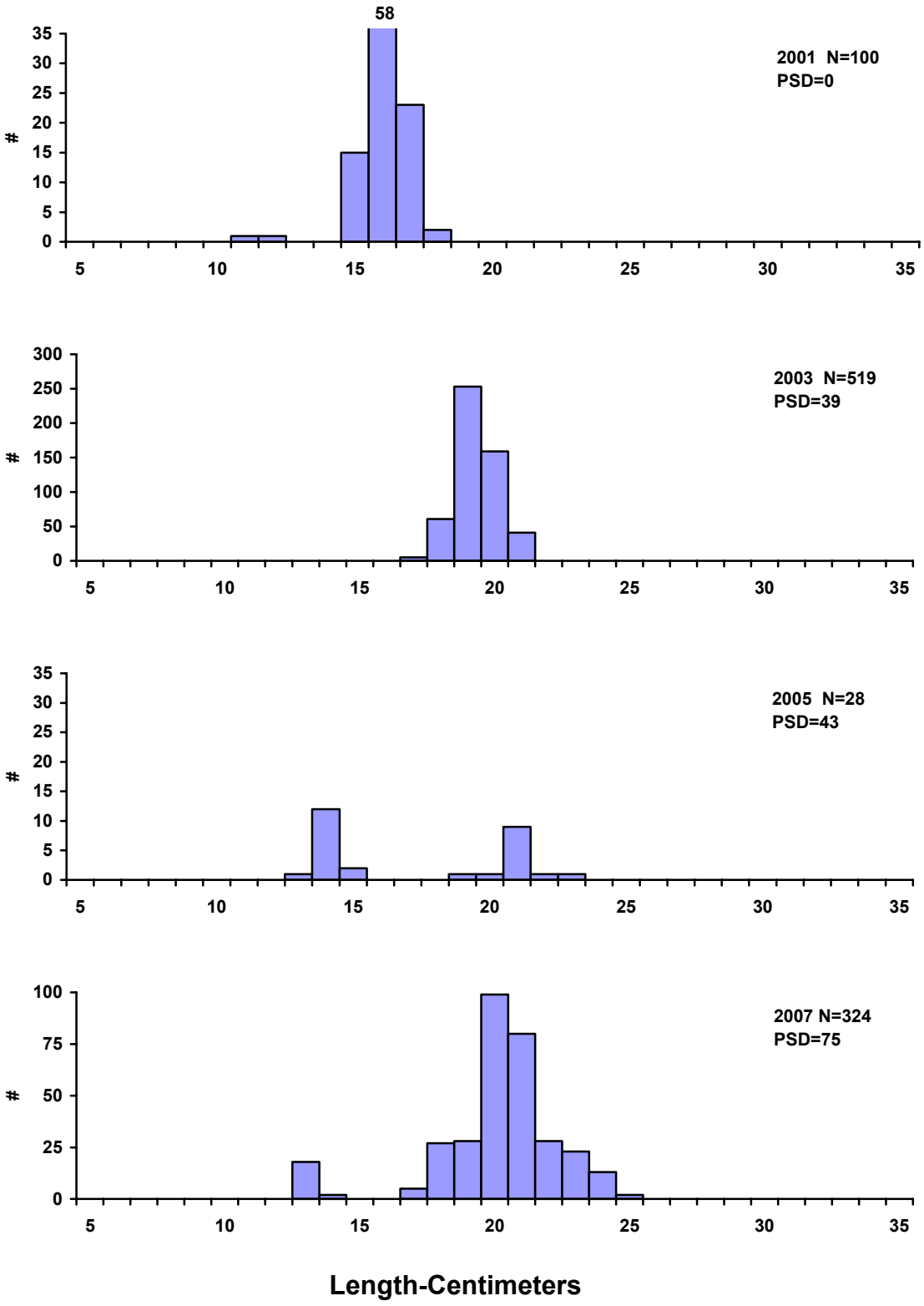

Figure 2. Length frequency histograms for black crappies sampled with trap nets in Menno Dam, Hutchinson County, 2001, 2003, 2005, and 2007.

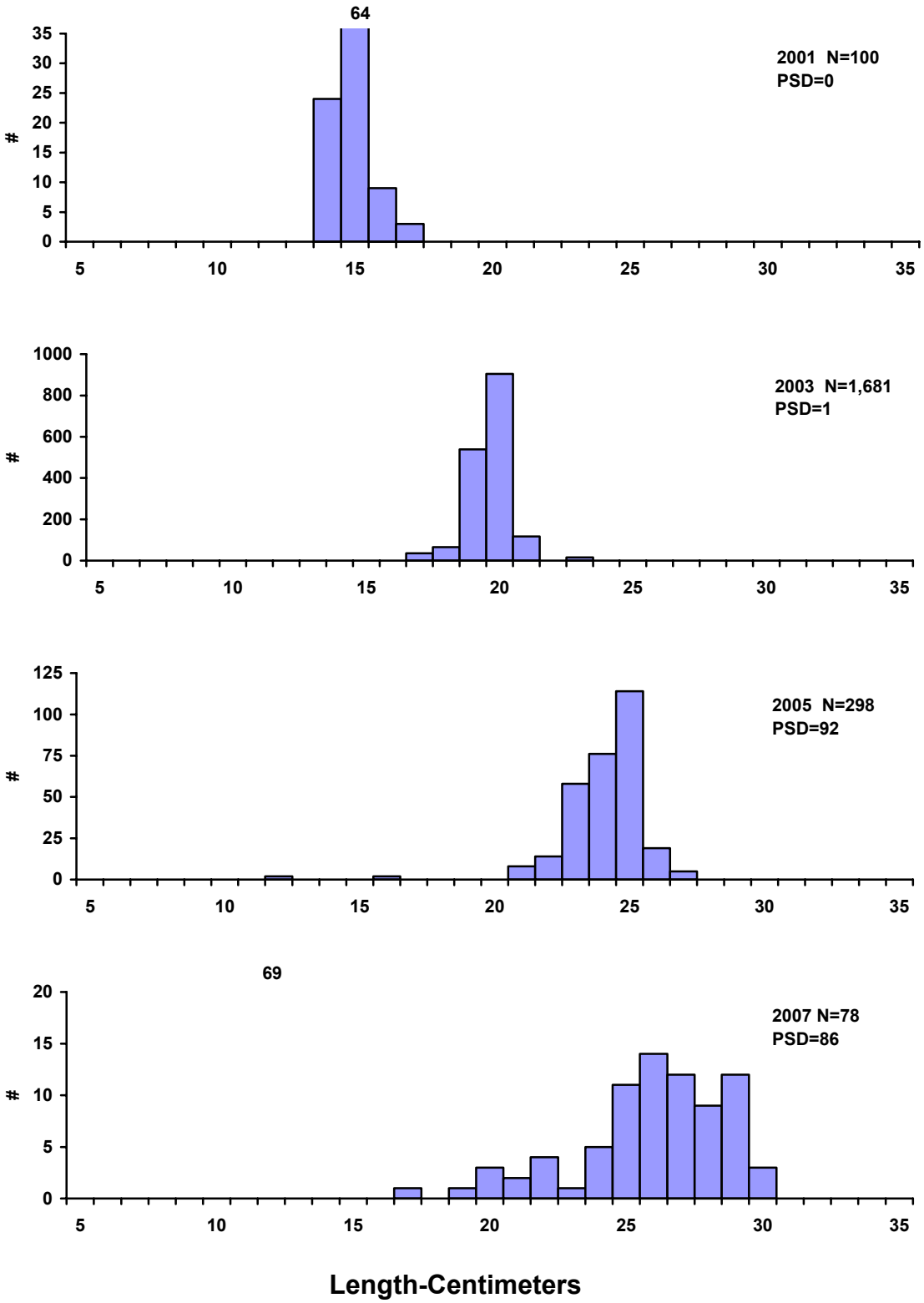

Figure 3. Length frequency histograms for black bullheads sampled with trap nets in Menno Dam, Hutchinson County, 2001, 2003, 2005, and 2007.

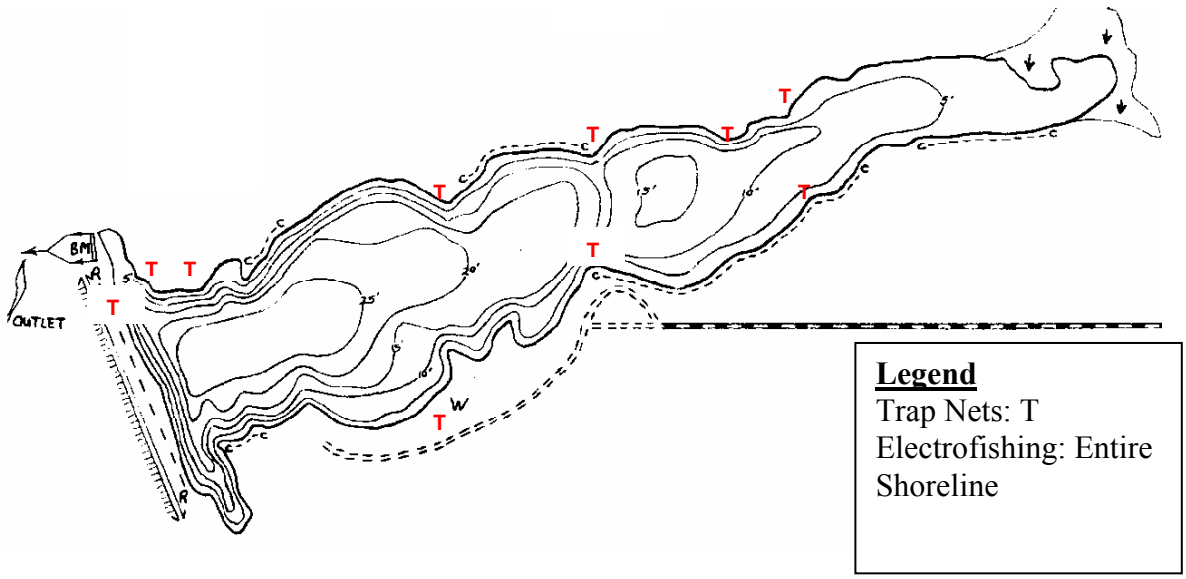

Figure 4. Sampling locations on Menno Dam, Hutchinson County, 2007.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters.

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25	38	51	63	76
Sauger	20	30	38	51	63
Yellow perch	13	20	25	30	38
Black crappie	13	20	25	30	38
White crappie	13	20	25	30	38
Bluegill	8	15	20	25	30
Largemouth bass	20	30	38	51	63
Smallmouth bass	18	28	35	43	51
Northern pike	35	53	71	86	112
Channel catfish	28	41	61	71	91
Black bullhead	15	23	30	38	46
Common carp	28	41	53	66	84
Bigmouth buffalo	28	41	53	66	84
Smallmouth buffalo	28	41	53	66	84

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.